

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-12 and 14 are currently pending. Claims 1, 3, 4, 6, 7, 11, and 12 are amended, Claim 13 is canceled, and Claim 14 is added by the present amendment. The changes to Claims 1, 3, 4, 6, 7, 11, and 12 and the addition of Claim 14 are supported by the original disclosure and, thus, add no new subject matter.<sup>1</sup>

In the outstanding Office Action, Claims 12 and 13 were rejected under 35 U.S.C. § 101 as directed to non-statutory subject matter; Claims 4, 6, and 7 were rejected under 35 U.S.C. § 112, first paragraph; Claims 1, 2, and 11-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kakarala et. al. (U.S. Patent No. 7,088,392, herein "Kakarala") further in view of Lin et. al. (U.S. Patent No. 6,069,973, herein "Lin"); Claims 3 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kakarala and Lin, further in view of Tsuruoka et. al. (U.S. Patent No. 6,721,003, herein "Tsuruoka"); Claim 8 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Kakarala and Lin, further in view of Skow (U.S. Patent No. 7,102,669) and Hirano et. al. (U.S. Patent No. 6,144,412, herein "Hirano"); Claims 9 and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kakarala and Lin, further in view of Neter (U.S. Patent No. 7,133,073); and Claims 4, 6, and 7 were indicated as including allowable subject matter.

Applicants thank the Examiner for the indication of allowable subject matter.

Amended Claim 12 is directed to a computer-readable medium and recites statutory subject matter. As such, Applicants respectfully request that the rejection of Claim 12 under 35 U.S.C. § 101 be withdrawn.

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<sup>1</sup> Amendments to Claims 4, 6, and 7 are supported in the specification at least in the portions cited by the outstanding Office Action at page 3. Claims 12 and 14 are supported at least by Claim 1 and original Claim 12.

Claim 13 has been canceled. As such, the rejection of Claim 13 under 35 U.S.C. § 101 is moot.

Claims 4, 6, and 7 are amended to comply with the enablement requirement. Thus, Applicants respectfully request that the rejection of Claims 4, 6, and 7 under 35 U.S.C. § 112, first paragraph, be withdrawn.

Turning now to the independent Claims, Claim 1 was rejected under 35 U.S.C. § 103(a) based on Kakarala and Lin. In the outstanding Office Action, Kakarala was cited as disclosing all the elements of Claim 1 except a generation means.<sup>2</sup> Lin was cited as disclosing the generation means recited in Claim 1.<sup>3</sup>

Applicants respectfully assert that Kakarala and Lin, taken in combination, do not satisfy the requirements for a *prima facie* case of obviousness, and that the rejection of Claim 1 should, therefore, be withdrawn.

Independent Claim 1 is directed to an image processing apparatus including:

extraction means for extracting a predetermined area centered on a pixel of interest, which is an object to be processed, from the color-and-sensitivity mosaic image;

generation means for making uniform the sensitivity characteristics relative to the optical intensity of pixels included in the predetermined area extracted by the extraction means and generating local area information including the pixels, each of the pixels having one of the plurality of color components and the uniform sensitivity characteristic relative to the optical intensity;

edge detection means for detecting an edge of the local area information on the basis of, of the pixels included in the local area information, pixels having a first color component;

first interpolation means for interpolating the first color component associated with the pixel of interest by computing a weighted average using, of the pixels included in the local area information, the pixels having the first color component on the basis of the direction of the edge detected by the edge detection means;

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<sup>2</sup> See outstanding Office Action at pages 4 and 5.

<sup>3</sup> See outstanding Office Action at page 5.

statistic-information computing means for computing statistical information on the basis of the pixels included in the local area information; and

second interpolation means for interpolating a color component other than the first color component associated with the pixel of interest on the basis of the first color component associated with the pixel of interest, which is interpolated by the first interpolation means, and the statistical information.

Kakarala describes an adaptive demosaic method that processes blocks of raw data at a time.

Kakarala does not teach the edge detection means recited in Claim 1. Kakarala describes determining **green, red and blue gradients** to calculate a vector that provides the direction of largest variation for the color image.<sup>4</sup>

Kakarala, therefore, cannot teach an edge detection means for detecting an edge “**on the basis of...pixels having a first color component**,” as recited in Claim 1.

Kakarala does not teach the first interpolation means recited in Claim 1. Kakarala describes the vector,  $u_2$ , that points in the direction of **least** change as the interpolation direction.<sup>5</sup> The vector calculated in Kakarala in the portion cited by the outstanding Office Action as disclosing edge detection as recited in Claim 1 is  $u_1$ , the direction of **largest** variation.<sup>6</sup>

Thus, Kakarala cannot disclose both the edge detection means and the first interpolation means as recited in Claim 1, because, as recited in Claim 1, the first interpolation means interpolates by computing a weighted average using pixels “**having the first color component on the basis of the direction of the edge detected by the edge detection means.**”

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<sup>4</sup> See Kakarala at column 8, line 53 to column 9, line 19.

<sup>5</sup> See Kakarala at column 9, lines 45-51.

<sup>6</sup> See Kakarala at column 8, line 53 to column 9, line 19.

Kakarala does not teach the second interpolation means recited in Claim 1. Kakarala describes using the same adaptive smoothing used for green pixels on red and blue pixels.<sup>7</sup>

Kakarala does not teach interpolating the red or blue pixels “**on the basis of the first color component** associated with the pixel of interest.” The adaptive smoothing described by Kakarala is the same for green, red or blue. In Kakarala, a first color does not undergo a first interpolation to form the basis of second interpolation for a color component other than the first.

Lin does not cure the deficiencies of Kakarala with respect to the elements discussed above. In addition, the outstanding Office Action does not cite Lin as disclosing these elements.

The outstanding Office Action concedes that Kakarala does not disclose the generation means recited in Claim 1 but asserts that Lin discloses the feature at least at column 4, lines 28-50, and column 4, line 65 to column 5, line 32.

Lin describes calibrating a multi-chip imaging array and including color correction factors in an imaging system. The calibration apparatus described by Lin ensures that variations in imaging elements caused by factors such as the variation in chip manufacture and thickness of color filters are accounted for with color correction factors.

Lin does not teach making the sensitivity characteristics of pixels in the predetermined area uniform relative to optical intensity. Lin also does not teach generating local area information including pixels, each with “uniform sensitivity characteristic relative to the optical intensity.” As discussed above, Lin describes calibrating a multi-chip imaging array and applying the bias calculated during calibration to image processing.

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<sup>7</sup> See Kakarala at column 16, lines 48-59.

Because Kakarala and Lin, taken in combination, do not teach at least the elements of Claim 1 discussed above, Applicants respectfully assert that a *prima facie* case of obviousness has not been established.

The outstanding Office Action cited Tsuruo, Skow, Hirano, and Neter against dependent Claims 3, 5, and 8-10. Applicants respectfully assert that Tsuruo, Skow, Hirano, and Neter do not cure the deficiencies of Kakarala and Lin discussed above. Thus, Applicants respectfully request that the rejection under 35 U.S.C. 103(a) of Claim 1 (and all claims dependent therefrom) be withdrawn.

Independent Claim 11 is directed to an image processing method and recites claim elements analogous to those of Claim 1. Independent Claim 12 is directed to a computer-readable medium and also recites claim elements analogous to those of Claim 1. Therefore, for the reasons discussed above, Applicants respectfully submit that Kakarala and Lin, taken in combination, do not establish a *prima facie* case of obviousness, and, thus, the rejection of Claims 11 and 12 should be withdrawn.

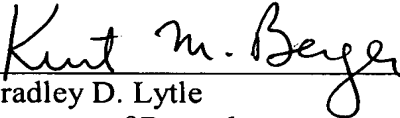
New Claim 14 is directed to an image processing apparatus and recites claim elements analogous to those of Claim 1. Thus, Claim 14 adds no new subject matter. For the reasons stated above with regard to Claim 1, Applicants respectfully submit that Claim 14 patentably defines over Kakarala and Lin.

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Accordingly, the outstanding rejections are traversed and the pending claims are believed to be in condition for formal allowance. An early and favorable action to that effect is, therefore, respectfully requested.

Respectfully submitted,

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A handwritten signature in cursive script, reading "Kurt M. Berger", is written over a horizontal line.

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